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Prepared by ECG Technology Communications Group

Compaq Computer Corporation

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Ordering and Configuration Guide for the ProLiant Cluster for NetWare 4.2

Abstract: The Compaq ProLiant Cluster for NetWare 4.2, featuring the Novell High Availability Server (NHAS) for NetWare 4.2/4.11 and Compaq servers and storage, extends reliability on the system level and provides automatic failover and failback between two servers with a No Single Point of Failure shared storage system. As a result, the Compaq ProLiant Cluster for NetWare 4.2 delivers to NetWare 4.2 environments the highest level of availability in the industry.

This document details the hardware necessary and provides configuration guidelines to help select the components needed to set up the ProLiant Cluster for NetWare 4.2.

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Introduction

When availability is a priority, the Compaq ProLiant Cluster for NetWare 4.2 provides robust fault tolerance across applications, clients, and storage by using Novell High Availability Server (NHAS) and the Compaq RAID Array 4000 Fibre Channel technology shared storage. The Compaq ProLiant Cluster for NetWare 4.2 consists of the following components:

- Two certified Compaq ProLiant servers
- Compaq StorageWorks RAID Array 4000 (formerly the Fibre Channel Storage System)
- Industry-Standard Network Interconnects
- Novell High Availability Server software
- NetWare 4.2/4.11 Network Operating System

A cluster, unlike stand-by failover solutions, consists of two servers, each with its own rights, permissions, clients, and volumes performing simultaneous, independent tasks. Should either of the servers fail, the surviving server will inherit all responsibilities and permissions of the failed server. Each server must be able access to the other's storage in order to respond successfully to requests that had been handled by the failed server. Currently, only the Compaq RAID Array 4000, formerly the Compaq Fibre Channel Storage System, allows for multi-server (multi-initiator) control of external storage on ProLiant servers.

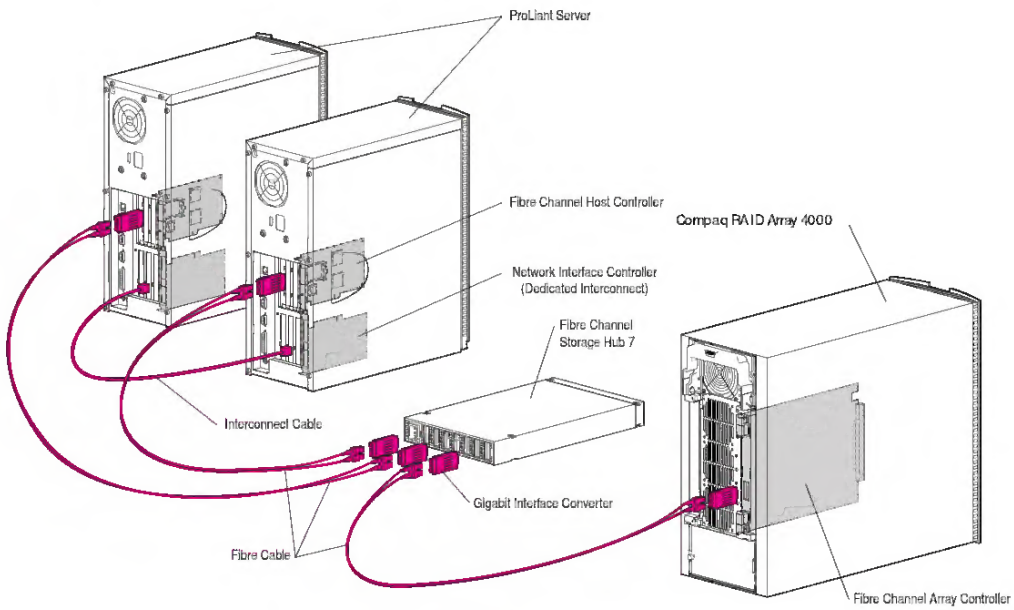

Figure 1. Minimum configuration for the ProLiant Cluster for NetWare 4.2

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In order for the surviving server to mount the volumes of the failed server, it must first detect the failure. On the ProLiant Cluster for NetWare 4.2, both nodes in the cluster monitor the other through three different interconnections. The cluster interconnects for the ProLiant Cluster for NetWare 4.2 are:

- The Fibre Channel Arbitrated Loop and shared storage – the "Disk Link".
- The servers' public LAN connection – the "NetWare Link".
- An optional dedicated connection between the two servers – the "Dedicated Link".

For an even higher level of availability, each interconnect can be configured with a redundant backup interconnect. The backup links consists of redundant Network Interface Cards (NICs) and cables for the NetWare and Dedicated links, and redundant Fibre Channel Host Controllers, storage hubs, Fibre Channel Array Controllers, and cables for the Disk link. If the primary interconnect fails, communication continues over the backup.

The ProLiant Cluster for NetWare 4.2 consists of ProLiant Servers, the Compaq StorageWorks RAID Array 4000 storage system, Novell High Availability Server, Novell NetWare 4.2, and at least two network adapters. The optional dedicated link between the servers requires two additional network adapters.

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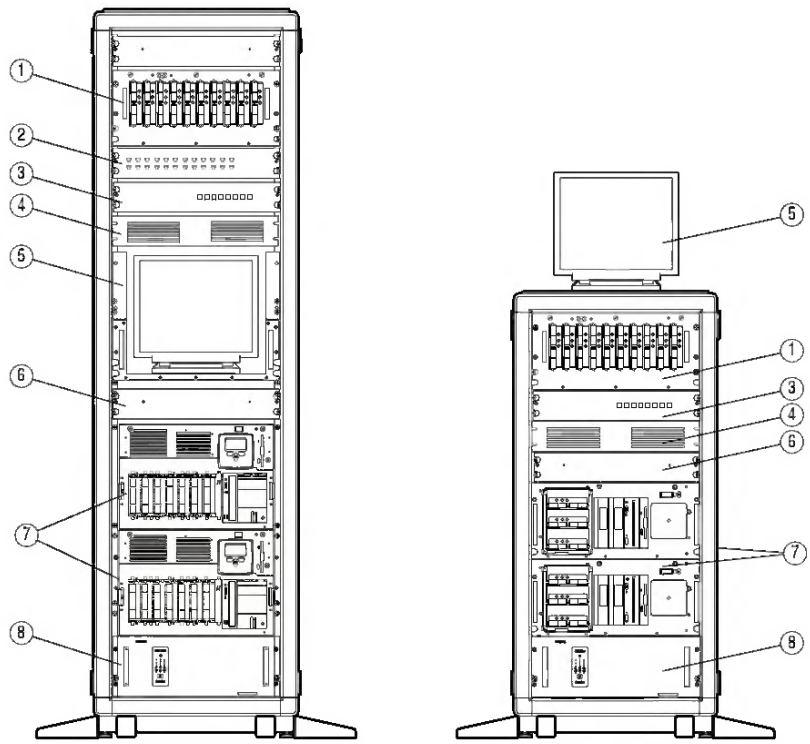
Cluster Configurations

Figure 2 shows two examples of rack-mounted cluster configurations. Each of these configurations includes two ProLiant servers and a complete Compaq StorageWorks RAID Array 4000 storage system with a Fibre Channel Storage Hub 7.



① Compaq StorageWorks RAID Array 4000
② Ethernet Hub
③ Switchbox
④ Dual Fibre Channel Storage Hub 7
⑤ Monitor
⑥ Keyboard tray
⑦ ProLiant Servers
⑧ Uninterruptible Power Supply (UPS)

Figure 2. Examples of rack-mounted ProLiant Cluster for NetWare 4.2

Optional components include UPS modules, racks, monitors, rack-mounted keyboards, and switchboxes. The racks shown are configured for optimal placement of cluster components. Compaq recommends the Compaq Rack Builder Pro software to customize and optimize rack configurations to your needs. You can download the Rack Builder or Rack Builder Pro software from the Compaq website at
http://www.compaq.com/products/servers/options/rackacces/rackbuilder.html

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Part Numbers and Components

Part numbers as of June 1999

Servers

123740-001	ProLiant 1850R 6/550 Model 1
386745-001	Proliant 1850R 6/500 Model 1
328970-001	ProLiant 1850R 6/450 Model 1
333100-001	ProLiant 1850R 6/400 Model 1
126747-001	ProLiant 3000 6/550 Model 1 512K (128MB)
382200-001	ProLiant 3000 6/500 Model 1 512K (128MB)
179720-001	ProLiant 3000 6/450 Model 1 Rack (128MB)
382250-001	ProLiant 3000R 6/500 Model 1 512K (128MB)
179730-001	ProLiant 3000R 6/450 Model 1 Rack (128 MB)
100734-002	ProLiant 5500 6/500 1 MB (256 MB) Model 1 Tower
100745-002	ProLiant 5500R 6/500 1 MB (256 MB) Model 2 Rack
352310-001	ProLiant 5500R 6/400 512K (128 MB) Model 1 Rack
388393-002	ProLiant 6400R 6/500-1 MB Model 2-256
388394-002	ProLiant 6400R 6/500-2 MB Model 2-1024
400092-002	ProLiant 6400R 6/500-512 KB Model 1-256
112726-001	ProLiant 6500 6/500-2 MB Model 2-512
179650-001	ProLiant 6500 6/450-2 MB Model 2-512
179610-001	ProLiant 6500 6/400-1MB Model 2-256
179600-001	ProLiant 6500 6/400-512 KB Model 1-256
112893-001	ProLiant 7000 6/500-2MB Model 2S-512
386671-001	ProLiant 7000 6/450-2MB Model 2S-512
312150-001	ProLiant 7000 6/400-1MB Model 1S-256

Miscellaneous

303309-002	Crossover Ethernet Direct Link Heartbeat Cable
309835-B21	100' Ethernet Cable
347272-B21	CL14U Cluster Rack Kit

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Related Storage Part Numbers

223100-001/291	RAID Array 4000 – Rack Mount
241300-001/291	RAID Array 4000 – Tower
223180-B21/291	Fibre Channel Host Adapter/P
262394-B21/291	Fibre Channel Host Adapter/E
234453-001/B31/291	Fibre Cbannel Storage Hub 7
295573-001	Fibre Cbannel Storage Hub 12
234459-B21	GBIC-SW Connector Kit
340412-B21	GBIC-LW Connector Kit
234457-B21	2m multi-mode Fibre Channel Cable Kit
234457-B22	5m multi-mode Fibre Channel Cable Kit
234457-B23	15m multi-mode Fibre Channel Cable Kit
234457-B24	30m multi-mode Fibre Channel Cable Kit
234457-B25	50m multi-mode Fibre Channel Cable Kit
242795-B21	Fibre Channel Storage Hub 7 Rackmount Kit
296324-B21	ProLiant/F to RAID Array 4000 Upgrade Kit
297162-B21	RAID Array 4000 Tower to Rack Conversion Kit
223187-B21	RAID Array 4000 Redundant Controller
224206-001	Optional Redundant Power Supply
262398-B21	Fibre Channel Array Controller 64-MB Cache Upgrade Kit
234468-B21	Fibre Cbannel Troubleshooting Kit

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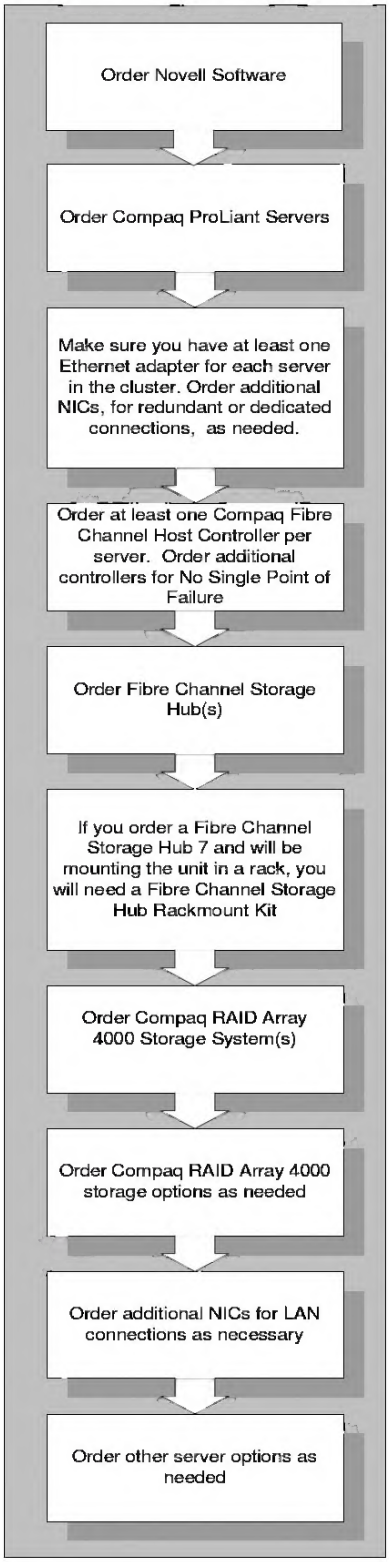
Ordering Process


Order Novell Software
Order Compaq ProLiant Servers
Make sure you have at least one Ethernet adapter for each server in the cluster. Order additional NICs, for redundant or dedicated connections, as needed.
Order at least one Compaq Fibre Channel Host Controller per server. Order additional controllers for No Single Point of Failure
Order Fibre Channel Storage Hub(s)
If you order a Fibre Channel Storage Hub 7 and will be mounting the unit in a rack, you will need a Fibre Channel Storage Hub Rackmount Kit
Order Compaq RAID Array 4000 Storage System(s)
Order Compaq RAID Array 4000 storage options as needed
Order additional NICs for LAN connections as necessary
Order other server options as needed

1. Obtain the Novell High Availability Server software.

Contact your local Novell reseller for pricing and ordering information.

2. Order Compaq ProLiant servers.

The most basic blocks of your cluster, Compaq ProLiant servers, are tested and certified for ProLiant Cluster for NetWare 4.2. When selecting the ProLiant model for your network, keep in mind that each server in your cluster should be able to deliver satisfactory performance when operating in failover mode. Also, make sure that the ProLiant model that you select has enough PCI/EISA slots to satisfy both current and future connections to the LAN, storage, and other cluster nodes.

3. Make sure that you have at least one Ethernet adapter for each server in the cluster.

As a minimum, each server in the cluster must contain one network adapter. If only one NIC is present in each server, this connection will be used for both LAN connections and NHAS monitoring. Order additional NICs for redundant LAN connections or dedicated NHAS monitoring as needed.

4. Order Compaq Fibre Channel Host Controller(s).

Each server must have at least one Fibre Channel Host Controller to connect to the RAID Array 4000 shared storage. If additional Fibre Channel loops of shared storage are used, order additional host adapters accordingly. Additional controllers will also be necessary to configure the RA4000 for No Single Point of Failure.

5. Order Compaq Fibre Channel Storage Hub(s).

In order to share a RAID Array 4000, the servers must access the array through a Fibre Channel Storage Hub. Order one hub for each Fibre Channel loop in your cluster. Order an additional hub if you are configuring a redundant Fibre Channel loop for No Single point of Failure storage configuration.

6. If you order a Compaq Fibre Channel Storage Hub 7 and will be mounting the unit in a rack, you will need a Fibre Channel Storage Hub 7 Rackmount Kit.

The Compaq Fibre Channel Storage Hub 7 cannot be mounted in a rack system without the rackmount kit. Order a rackmount kit for each FC Storage Hub 7 that will be rack-mounted. Compaq Fibre Channel Storage Hub 12 does not require a rackmount kit.

7. Order Compaq Raid Array 4000 Storage System(s).

As the main component of the shared storage, at least one Compaq RA4000 storage system is required for each ProLiant Cluster. Additional RA4000 storage systems may be connected within the cluster as part of a single Fibre Channel loop or added as a separate loop. In addition to the RA4000 storage system(s), each loop will require its own hub and host adapters.

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8. Order Compaq Fibre Channel Storage options as needed.

Order hard drives, cabling, and redundant power supplies as per your requirements. The RAID Array 4000 Redundant Controller can also be ordered. This option enables you to configure a dual redundant Fibre Channel loop, and includes an additional Fibre Channel Array Controller, two GBIC-SW Connector Kits, and a Fibre Channel cable. Also, be sure you have the correct drivers and firmware for the Redundant Controller option. The Redundant Controller option requires Fibre Channel Array Controller firmware version 2.34 or higher on both controllers, and NetWare drivers CPQFC.HAM version 2.00 and CPQFC.CDM version 1.30 (found on Smart Start 4.30 and Novell Software Support Diskettes (NSSD) 5.10A)

9. Order additional NICs for LAN connections as necessary.

10. Order other server options as needed.

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